

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2000-236209

(43)Date of publication of application : 29.08.2000

(51)Int.Cl.

H01Q 5/02

H01Q 9/14

(21)Application number : 11-035277

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<NTT>

(22)Date of filing : 15.02.1999

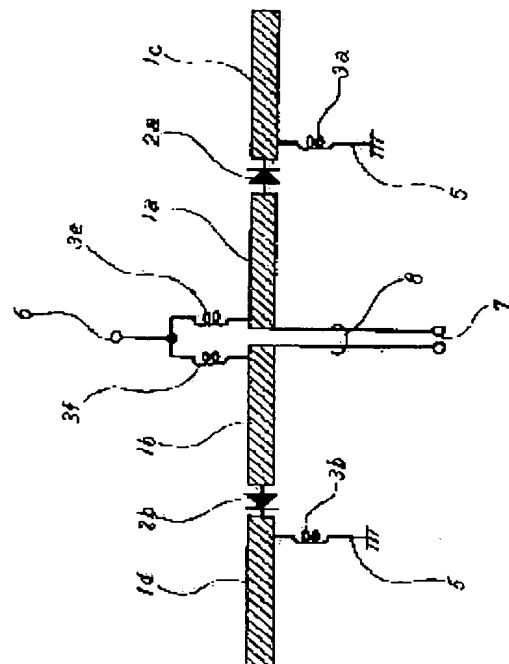
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(54) ANTENNA SYSTEM

(57)Abstract:

PROBLEM TO BE SOLVED: To actualize a multifrequency common-use antenna which can have its resonance frequency switched under simple control and is affected little by multifrequencies.

SOLUTION: This is a dipole antenna or monopole antenna constituted by using a linear conductor or a dipole antenna or monopole antenna constituted on a dielectric substrate. Radiation element parts of the dipole antenna are each composed of at least two metal pieces, and the metal pieces of respective radiation elements are connected through diode switch circuits 2a and 2b; and metal pieces 1a to 1f having feed points connect one end of a filter circuit, which cuts off a high-frequency signal nearby the feed points and connect the other end of this filter circuit to a control terminal and metal pieces having no feed point, are short-circuited to a ground plate via the filter circuit which cuts off a high-frequency signal nearby the points of connections with adjacent metal pieces.



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CLAIMS

[Claim(s)]

[Claim 1] It is the dipole antenna or monopole antenna constituted on the dipole antenna constituted from a conductor, the monopole antenna, or the dielectric substrate. a line -- About the piece of a metal which constitutes the radiating element section of an antenna from at least two or more pieces of a metal, respectively, connects between the piece of a metal of each radiating element through a diode switch circuit, and has the feeding point About the piece of a metal which connects the end of the filter circuit which intercepts a RF signal [near the feeding point], connects the other end of this filter circuit to a control terminal, and does not have the feeding point Antenna equipment characterized by connecting with a cope plate too hastily through the filter circuit which intercepts a RF signal in near a node with the adjoining piece of a metal.

[Claim 2] It is the dipole antenna or monopole antenna constituted on the dipole antenna constituted from a conductor, the monopole antenna, or the dielectric substrate. a line -- About the piece of a metal which constitutes the radiating element section of an antenna from at least two or more pieces of a metal, respectively, connects between the piece of a metal of each radiating element through a diode switch circuit, and has the feeding point About the piece of a metal which connects the end of the filter circuit which intercepts a RF signal [near the feeding point], connects the other end of this filter circuit to a control terminal, and does not have the feeding point Antenna equipment characterized by connecting with a cope plate too hastily through the filter circuit and the resistor for a bias voltage setup which intercept a high frequency signal in near a node with the adjoining piece of a metal.

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the multifrequency common antenna which can change resonance frequency by very simple control of changing the bias voltage applied to a control signal about a multifrequency common antenna.

[0002]

[Description of the Prior Art] Drawing 3 is drawing showing the example of the configuration of the conventional multifrequency common antenna, and shows the sectional view [in / (a) and / in (b) / A-A of drawing 3 (a)]. [a plan]

[0003] this drawing -- setting -- the figure sign 9 -- a dielectric substrate and 10 -- a slot and 11 -- a feeder way and 12 -- a metal patch -- it is -- 13 -- the ground -- the conductor is expressed. This conventional antenna equipment makes the metal patch 12 of the microstrip antenna of slot coupling the shape of a strip of paper, and makes excitation possible in two or more frequencies by changing the die length of each piece of a metal.

[0004] It is indicated by Japanese Patent Application No. No. 70411 [ten to] about such antenna equipment. This antenna equipment needs to prepare the filter circuit for oppressing the unnecessary electromagnetic wave from an adjoining radio communications system etc., when carrying out radio cis- TEMUHE application in two or more frequencies at coincidence, since it can excite.

[0005] Drawing 4 is drawing showing the example of the configuration using the conventional print dipole antenna. In this drawing, in the figure sign 9, a feeder way and 14 show a dipole antenna component, and, as for a dielectric substrate and 11, 15 shows the strip conductor.

[0006] This antenna equipment uses properly the print dipole antenna used on two or more frequencies for every resonance frequency, and further, it is devised so that interference between each print dipole antenna may be suppressed with a strip conductor 15.

[0007] Since this antenna equipment cannot resonate one antenna on two or more frequencies and it needs to prepare a different antenna for every required frequency when using on two or more frequencies, the whole antenna equipment enlarges it inevitably.

[0008]

[Problem(s) to be Solved by the Invention] Conventional multifrequency common antenna equipment as were mentioned above and shown in drawing 3 made the metal patch of the microstrip antenna of slot coupling the shape of a strip of paper, and in order to make excitation possible in two or more frequencies by changing the die length of each piece of a metal, when radio cis- TEMUHE application was carried out, it had the technical problem that the filter circuit for oppressing the unnecessary electromagnetic wave from an adjoining radio communications system etc. had to be prepared.

[0009] Moreover, since the antenna equipment of the configuration using the conventional print dipole antenna as shown in drawing 4 is what uses properly the print dipole antenna used on two or more frequencies for every resonance frequency, it cannot resonate one antenna on two or more frequencies.

[0010] Therefore, since a different antenna for every required frequency needed to be prepared when antenna equipment was used on two or more frequencies, the technical problem that the whole antenna equipment was enlarged inevitably occurred.

[0011] In view of such a conventional technical problem, it is made to excite in single frequency, and this invention can change driven element length with a control signal fundamentally, and, thereby, aims at realizing the antenna equipment which can be used also in a different frequency.

[0012]

[Means for Solving the Problem] According to this invention, an above-mentioned technical problem is solved by the means indicated to said claim. namely, invention of claim 1 -- a line -- the dipole antenna constituted on the dipole antenna constituted from a conductor, the monopole antenna, or the dielectric substrate, or a monopole antenna -- it is -- the radiating

element section of an antenna -- respectively -- at least two or more pieces of a metal -- constituting -- between the piece of a metal of each radiating element -- a diode switch circuit -- minding -- connecting -- [0013] It is antenna equipment which intercepts a RF signal in near a node with the adjoining piece of a metal about the piece of a metal which connects the end of the filter circuit which intercepts a RF signal [near the feeding point] about the piece of a metal which has the feeding point, connects the other end of this filter circuit to a control terminal, and does not have the feeding point, which carried out filter circuit ** and which was connected with the cope plate too hastily.

[0014] invention of claim 2 -- a line -- the dipole antenna constituted on the dipole antenna constituted from a conductor, the monopole antenna, or the dielectric substrate, or a monopole antenna -- it is -- the radiating element section of an antenna -- respectively -- at least two or more pieces of a metal -- constituting -- between the piece of a metal of each radiating element -- a diode switch circuit -- minding -- connecting -- [0015] It is antenna equipment connected with the cope plate too hastily through the filter circuit and the resistor for a bias voltage setup which intercept a RF signal in near a node with the adjoining piece of a metal about the piece of a metal which connects the end of the filter circuit which intercepts a RF signal [near the feeding point] about the piece of a metal which has the feeding point, connects the other end of this filter circuit to a control terminal, and does not have the feeding point.

[0016] By the above-mentioned configuration, by connecting and opening electrically the piece of a metal which is the radiating element of a print dipole antenna with the bias voltage impressed from the control terminal, this invention can change the substantial die length of a radiating element, and can change resonance frequency.

[0017] The piece of a metal which does not have the feeding point constitutes from invention of claim 2 so that it may connect with a cope plate too hastily through the filter circuit and the resistor for a bias voltage setup which intercept a high frequency signal in near a node with the adjoining piece of a metal.

[0018] Therefore, when the configuration which divides the radiating element of one side of a dipole antenna into three or more pieces of a metal especially is taken, the diode switch inserted among those pieces of a metal can be controlled alternatively, and can be easily resonated in a desired frequency.

[0019]

[Embodiment of the Invention] Drawing 1 is drawing showing the 1st example of the gestalt of operation of this invention. this drawing -- setting -- the figure signs 1a-1d -- the piece of a metal, and 2a-2d -- a diode switch circuit and 3a-3d, in touch-down and 6, a control terminal and 7 express an input/output terminal and, as for the choke coil for a high frequency cut, and 5, 8 expresses the balanced line.

[0020] This drawing inputs a balanced signal into a RF signal input terminal, constitutes a dipole antenna component on either side from two pieces of a metal, respectively, and possesses a diode switch circuit between each. In addition, in this example, although the example which used the diode switch circuit for the switching circuit was shown, it is also possible to use other solid state switch circuits and a relay circuit.

[0021] Moreover, it has connected with each piece of a metal too hastily through the choke coil for high frequency signal cutoff. Moreover, the input of a control signal is performed from the high frequency signal input terminal of a dipole antenna, and the control terminal connected to the near through the choke coil for high frequency signal cutoff.

[0022] In addition, also in the print dipole antenna possessing the converter which changes an unbalance signal into a balanced signal, it is usable. In drawing 1, when the electrical potential difference applied from a control terminal is zero, diode switch circuit 2a and 2b do not operate, but the component excited serves as only a basic piece of a metal, and resonates in the highest frequency.

[0023] Moreover, diode switch circuit 2a and 2b flow by applying the bias voltage to which diode switch circuit 2a and 2b operate from a control terminal, and since even the piece of a metal which is up to two right and left serves as component length, resonance frequency turns into a low frequency.

[0024] Drawing 2 is drawing showing the 2nd example of the gestalt of operation of this invention. this drawing -- setting -- the figure signs 1a-1f -- the piece of a metal, and 2a-2d -- a diode switch circuit and 3a-3f -- the choke coil for a high frequency cut, and 4a-4d, in touch-down and 6, a control terminal and 7 express an input/output terminal and, as for a resistor and 5, 8 expresses the balanced line.

[0025] This drawing inputs a balanced signal into a RF signal input terminal, constitutes a dipole antenna component on either side from three pieces of a metal, respectively, and possesses a diode switch circuit between each. In addition, in this example, although the example which used the diode switch circuit for the switching circuit was shown, it is also possible to use other solid state switch circuits and a relay circuit.

[0026] Moreover, the choke coil for high frequency signal cutoff and the resistor for a bias voltage setup of operation are connected with each piece of a metal too hastily through the circuit connected at the serial. Moreover, the input of a control signal is performed from the high frequency signal input terminal of a dipole antenna, and the control terminal connected to the near through the choke coil for high frequency signal cutoff.

[0027] In addition, also in the print dipole antenna possessing the converter which changes an unbalance signal into a balanced signal, it is usable. In drawing 1, when the electrical potential difference applied from a control terminal is zero, diode switch circuit 2a and 2b do not operate, but the component excited serves as only a basic piece of a metal, and resonates in the highest frequency.

[0028] Moreover, diode switch circuit 2a and 2b flow by applying the bias voltage to which diode switch circuit 2a and 2b operate from a control terminal, and since even the piece of a metal which is up to two right and left serves as component length, resonance frequency turns into a high frequency the 2nd.

[0029] Next, since antenna resonance length can be made into all the pieces of a metal by ****(ing) diode switch circuit 2a, 2b, and bias voltage to which 2c and 2d operate from the control terminal 6, it can be made to resonate in the lowest frequency.

[0030] since [in addition,] these are changing the antenna resonance length itself -- a multifrequency common antenna -- it is also -- ***** and the interference from other frequencies cannot take place easily. Therefore, it can be used also in the radio communications system with which we are anxious about cross modulation etc.

[0031] Although above-mentioned explanation shows the example which constitutes the radiating element section of a dipole antenna from at least six pieces of a metal, this invention is not restricted to this, and if it constitutes each radiating element section of a dipole antenna from two or more pieces, it is applicable.

[0032] Moreover, it cannot be overemphasized that you may make it control closing motion of a diode switch by relation between this electrical potential difference and the electrical potential difference impressed from the control terminal 6 by ****(ing) bias voltage at the node of the choke coil for a high frequency cut of drawing 1 and a resistor. Moreover, although the above-mentioned description has described the case where a radiating element is formed by the piece of a metal, this may be a metal membrane and a metal box, or may be based on conductors other than a metal.

[0033]

[Effect of the Invention] As explained above, in the flat-surface print dipole antenna equipment constituted on the dielectric substrate, the antenna equipment of this invention constituted each radiating element section of a dipole antenna from at least two or more pieces of a metal, respectively, and has taken the configuration which connects between the above-mentioned piece of a metal through a switching circuit.

[0034] And the above-mentioned switching circuit is further opened and closed with the bias voltage impressed from the control terminal, and he changes the substantial die length of the radiating element of a dipole antenna, and is trying to change resonance frequency.

[0035] The component length of a dipole antenna can be changed by simple control of changing the bias voltage impressed from the control terminal by this configuration, and two or more single frequency can be resonated efficiently.

[0036] Therefore, according to this invention, there is an advantage which can realize easily the broadband print dipole antenna equipment which cannot receive the interference from other frequencies of a small and brief configuration easily possible [changing resonance frequency very easily].

[0037]

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is drawing showing the 1st example of the gestalt of operation of this invention.

[Drawing 2] It is drawing showing the 2nd example of the gestalt of operation of this invention.

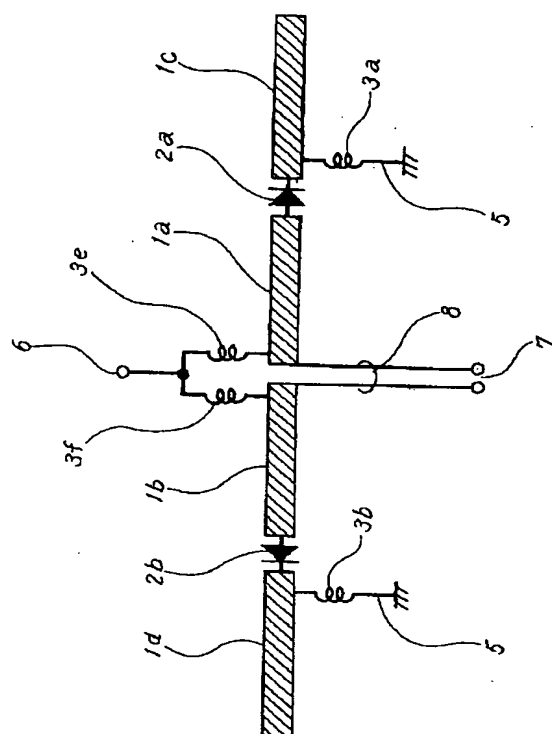
[Drawing 3] It is drawing showing the example of a configuration of the conventional multifrequency common microstrip antenna.

[Drawing 4] It is drawing showing the example of a configuration of the conventional print dipole antenna.

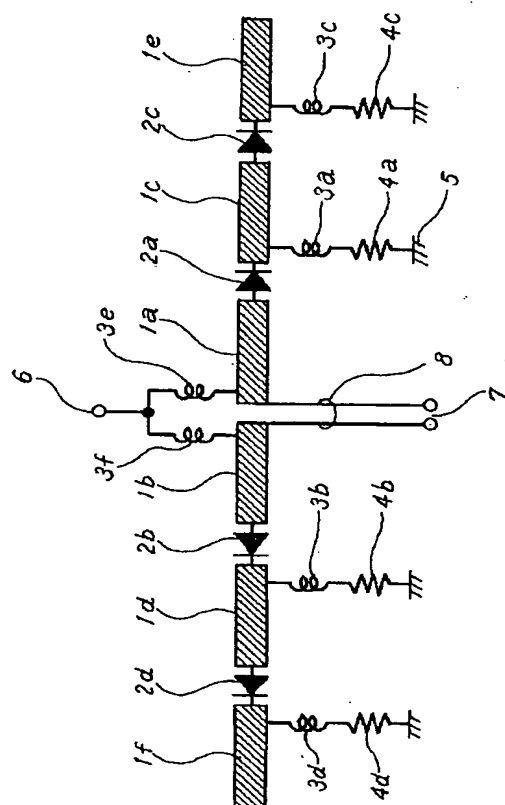
[Description of Notations]

- 1a-1f Piece of a metal
- 2a-2d Diode switch circuit
- 3a-3f Choke coil for a high frequency cut
- 4a-4d Resistor
- 5 Touch-down
- 6 Control Terminal
- 7 Input/output Terminal
- 8 Balanced Line
- 9 Dielectric Substrate
- 10 Slot
- 11 Feeder Way
- 12 Metal Patch
- 13 Ground -- Conductor
- 14 Dipole Antenna Component
- 15 Strip Conductor

本発明の実施の形態の第1の例を示す図

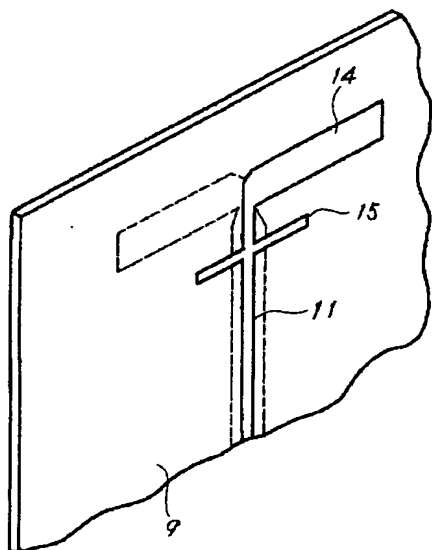


本発明の実施の形態の第2の例を示す図



[Drawing 4]

従来のプリントダイポールアンテナの構成例を示す図



[Drawing 3]

従来の多周波共用マイクロストリップアンテナの構成例を示す図

